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Problem based Learning-Based E-Learning to Improve Decision Making Skills of Students

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Abstract: The purpose of this study is to determine the effectiveness of the application of online learning (e-learning) with problem based learning method in improving student's decision making skills. The selected subjects were 40 students from guidance and counseling Department of Muria Kudus University who took the course of counselor's personal development. The design of this study was an experiment in which there were 1 experimental class and 1 control class, each of which consisted of 20 students. The result of t count for decision making skills in the class of treatment was 2.06> t table of 2.03. Therefore, it can be concluded that Problem Based Learning-based e-learning was effective to improve student's decision making skills. This article will provide reinforcement support for learning innovation, especially in the implementation of e-learning.

Keywords: *E-Learning, Problem Based Learning, Decision Making Skills.*

I. INTRODUCTION

Decision making is the process of making careful choices based on certain considerations [1], [2]. In various educational curricula, this process is common as soft skill development of students as an indicator of certain level of education and achievement [3]. This ability is considered important because it will affect the extent to which a person is able to determine what must be carried out every time he is dealing with certain problems in his life. In the basic education curriculum in Lebanon, decision making even has a special portion to be taught to students in grades 1-3 of primary schools [4].

Decision making behavior is related to theorists of organizational behavior as in March and Simon's book, Organization, issued in 1958, although the field becomes more interesting with topics such as motivation and goals, and emphasizes reduced decision making [5]. The field of decision making behavior is developed outside the theories and research of organizational behavior by cognitive psychologists and experts of decision theory in economics and information. However, there has recently been a reemerging interest in decision making behavior, and has returned to the path of organizational behavior. Although classic decision-making theory runs on the assumption of rationality and certainty, behavior decision theory does not occur to be so. Decision-making behavior theorists are in agreement that individuals have cognitive limitations. The complexity of the organization and the world in general causes individuals to act in situations of uncertainty and information that is so ambiguous and incomplete [6].

Counselors are professionals who are expected to be able to provide assistance in helping to take decisions when clients are faced with difficult choices [7]. Therefore, counselors must possess the ability to make good decisions before being transferred to clients. For this reason, from the beginning of the education process, counselors must be equipped with the ability to make decisions

so that in the practice of providing counselor services, they are able to demonstrate their professional abilities. For this reason, the formation of a counselor's life and skills requires innovations that will aid the improvement of the quality of the counselor graduates [8], [9].

In the journey, the learning process that involves face to face session is considered to be easily limited by space and time because it is very dependent on the willingness of both parties to be present at the same time. For some people, this activity is very energy consuming and even difficult to do because of busyness and activities outside the learning [10]. Learning with an online model (e-learning) is considered capable of answering these challenges because there is no requirement of having to meet face to face at the same time and is not obstructed by spaces where the people must be in the same place. The concern for social interaction can be overcome because social dimensions will be formed through communication that occurs in the online media used [11]. The information presented in online learning is even considered to be more complete since students are free to explore other materials beyond those presented by lecturers without being filled with psychological pressure that usually arises when learning offline [12].

In order for e-learning to run more effectively, it is necessary to do certain modifications with other learning methods so that the results are more effective. Problem Based Learning is one of the answers to the problem of low ability of thinking at a higher level. The essence of PBL is the collaboration of students to work together to solve the problems presented [13]. A research conducted by Fitrah [14] showed that problem based learning can improve students' mathematical concepts. Student activities in groups allow them to gain experience and new insights that have never been encountered during independent learning and to optimize student activities in exploring material in depth [15]. PBL is the right way to reflect and enculturate students which can be difficult if they have to deal with lecturers employing lecturing method [16]. Another study showed a significant increase in learning achievement when PBL was utilized in the lecture process [17]. Due to this reason, several majors in higher education even half require PBL as a lecture strategy because it is considered capable of improving the quality of graduates comprehensively [18].

Even though it is considered good, e-learning must be established with a supportive learning environment including high motivation of lecturers and students and communication with adequate frequency so that the confidence in the effectiveness of this method is well maintained [19]. This will answer doubts about the ethics of distance learning that has been voiced by several parties [20]. Consequently, the efforts to apply PBL method in e-learning must continue to be studied and researched to obtain input on things that might be lacking or even superior from the method.

The main question the answer of which is going to be sought in this article is the effectiveness of e-learning with PBL approach in improving student's decision making skills. The research was carried out in higher education level because it was considered an educational institution which at this time was urgent to immediately improve its skills rather than higher education level. The subjects were prospective counselors who will be prepared personally as decision makers both jointly with clients and for institutional interests in educational institutions.

II. METHOD

The method used was a true experiment in which the population was the guidance and counseling students of Muria Kudus University who were studying the counselor's personal development

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course. In the second semester of 2018/2019, there were two study groups, each of which consisted of 20 students. Both were then designated as the experimental group and the control group where class A was the experimental group and class B was the control group.

The instrument used was a decision making skills test that was developed based on the indicators and substance of the counselor's personal development course material. Previously, construct validation was carried out by involving 2 validators and factual validation by examining 20 guidance students and clients. The results of the validity and bias tests can be observed in Table 1 and Table2:

Table 1. KMO Factor and Bartlett's Test Analysis Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.712
Bartlett's Test of Sphericity	Approx. Chi-Square	101.882
	df	21
	Sig.	.000

Based on table 1., the values of KMO and Bartlett's Test for the desired correlation between variables were > 0.5. The significance of the study was 0.05. From the above results, it could be obtained that KMO value was 0.767, which was greater than 0.5. Meanwhile, the significance value generated from Bartlett's Test of Sphericity was 0,000 [21], [22]. With the above results, it can be suggested that the variables and samples used allow for further analysis.

The instrument reliability test aims to measure the consistency of the instrument. Instrument reliability test refers to the consistency of responses given to the question items that measure a Constructive Theory. The measurement reliability indicates the extent to which these measurements are free of bias and ensures that they are consistent in time and across a variety of questions. The reliability test of skill scales for career decision making was carried out using SPSS 22. The results are as follows:

Table 2. Reliability Analysis Results

Reliability Statistics

Cronbach's Alpha	N of Items
.912	2

If the value of alpha is > 0.7, it means that reliability is sufficient (sufficient reliability) while if the value of alpha is > 0.80, it suggests that the entire items are reliable and the whole tests are internally consistent because they have strong reliability. The reliability test results showed 0.952 (according to Table 2). This means that the alpha value of 0.912 was > 0.7 which means that this instrument was reliable. The validity and reliability tests of this instrument underlie the researchers to use the instrument in the designed research.

III. RESULT AND DISCUSSION

The application of e-learning was carried out for 6 lecturing times with the details that in the first meeting, the lecturer explained the stages and examples of the way to solve problems with the PBL method. In the second meeting, the lecturer gave a problem and the students were provided the opportunity to directly convey the core formulation of the answers to the problem presented. The lecturer then responded to the formulation in this meeting. In the third to the fifth meetings, the students presented the results of their discussion while getting some feedback from the lecturer and other students. While the meeting was carried out, students attempted to obtain the reflection of the findings during the process. After that a post test was performed to determine the effectiveness of the results.

After having the pre-test and post-test on the research subjects, the results are obtained as displayed in table 3.

Table 3. T-test results of decision making skills

Variation	Pos-test value of decision making skills	
	Control Class	Experimentation Class
Mean	69	81
dk	36	36
t_{count}	2.14	
t_{table}	2.03	
Criteria	The value of decision making skills of the experimental class students is the same as the value of the character of the control class students	

The results of the analysis of test data for increasing the gain of decision making skills are shown in Table 4 as the following.

Table 4. Gained decision making skills test results

Mean	Pre-test	Post-test	Gain	Criteria
Experiment	66	81	0.34	medium
Control	66	69	0.19	low

Table 3 and table 4 show the significant results in the use of e-learning with PBL method. The control group was provided an e-learning service without an approach while the e-learning experimental group was provided with the PBL approach. The results of e-learning with the PBL approach were more significant compared to the control group. The indicators of skills in making decisions in the study are comprised of; (1) ability to understand themselves in the form of talents, interests and abilities possessed, (2) ability to identify available options, (3) ability to identify the alternative outcomes if the decision is chosen, (4) ability to identify the likelihood of success of each choice based on identification of personal abilities with alternative options available, (5) ability to consider the pros and cons of choices, especially the environmental factors that might put pressure on the decisions to be taken, (6) flexibility in making decisions and (7) responsibility for the decisions made. Each of those seven indicators has a different role in supporting the skills of the students in making decisions [23]. In the context of counselor education, it is important to know the level of decision making abilities and to see how the prospective counselor's tendency to choose to enter or avoid risky behaviors [24].

Decision making is a cognitive process in students who collaborates both attitude and action components when facing a problem [6], [25], [26]. Cognitive activity takes place systematically in the human brain to process the incipient information obtained to be manufactured into new knowledge and insights as the initial decision-making process [27]–[30]. This process continues with the birth of a perception through cognitive processing of information which is often influenced by students' attitudes towards a problem as well [31], [32]. Even though anxiety sometimes occurs due to cognitive activity, the decision is still taken as a manifestation of a mature perception and outlook of a problem [33], [34]. Another research even designed a computer-based program to assist a decision that is often referred to as a decision support system [35]. Such support system can be utilized as training media in the educational context of prospective counselors or decision-making aids in the service context.

Problem based learning provides students with the opportunity to change their perceptions, retention and application of knowledge to the problems presented [36]. Even so, the activities must still be carried out in a guided manner so that the desired competencies are actually achieved in accordance with the agreed design [37]. PBL also provides a

great opportunity for students to become an important part of the curriculum and increase the initiative and motivation to continue to develop [38], [39]. This will further support contextualization, reconstruction, increased independence and student collaboration [40].

Learning by e-learning method allows students to have high self-efficacy due to the opportunity for free exploration without the slightest psychological anxiety that usually occurs when meeting face to face [41]. The graphical display in online research is inferred to be one of the parts that influences students' interest and motivation in participating in every part of learning [42]. This is one of the important assets in an effort to intervene in decision making skills through a graphical information processing model that attracts students to dig deeper into solving the problems presented. The evolution of e-learning continues to develop as the development of communication technology so that the running process should be able to be part of the development of students' insights and perceptions [43], [44]. The readiness of lecturers and students [45] is the key to the success of the transplantation of PBL in e-learning activities that support improvement in decision making skills. Decision sequences that are often found partially in problem solving can really be compiled comprehensively through e-leaning with PBL approach [46].

IV. CONCLUSION

PBL-based e-learning is able to create a constructive, collaborative, motivational and contextual learning environment to generate soft skills, especially decision-making skills for students. The findings that show effective results do not rule out the possibility to discover other more innovative development potentials to optimize e-learning for distance learning activities. The most important thing is to turn off the readiness of lecturers and students to learn to develop themselves to solve problems in different perspectives although in the end, the unity of ideas to develop the academic ecology of the entire academic community has to be discovered.

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